

ABSTRACT OF THE DISCLOSURE

Removing metals from metal containing acidic solutions, such as contaminated waters and industrial wastewaters, is described. An amphipathic, heterocyclic, metal-coordinating compound (an extraordinary ligand) and a sorbent are added to a solution, such that the addition, at a specific acidic pH of the solution, causes at least some of the metal-coordinating compound to bind with some of the metal cations and at least some of the metal-coordinating compound sorbs to the sorbent, along with any metal cations bound therewith. The compound and the sorbent may be added to the solution, either together or independently, so that the compound may bind the metal. The metal binding compound may be a benzotriazole, a benzothiazole, or another compound to bind a metal. The sorbent is selected to interact with the metal-coordinating compound in sequestering the metal from solution as part of a complexation. Thereafter, the ligand-metal complex may be removed from the solution.